

Some research suggests that some aspects of attention are actually normal in individuals with ADHD. The aspect of attention with which individuals with ADHD do have problems is vigilance (being able to “watch out” for something important). Another cognitive area that appears to be impaired is being able to effectively control one’s own cognitive processes such as staying on task, maintaining effort, or engaging in self-control (Nigg, 2010).

These findings have prompted researchers to reexamine the causes of ADHD and have highlighted the likelihood of more than one cause and more than one brain route to ADHD. Research is looking at a variety of areas including environmental factors such as low-level lead exposure, genetic influences, the role of heredity and familial factors, and personality factors (Forster & Lavie, 2016; Nigg, 2010; Nigg et al., 2016). Furthermore, causes for the prevalence of ADHD continue to be examined, with variables ranging from the impact of sleep, circadian rhythms, and environmental light exposure (Arns et al., 2013) to the manner in which ADHD symptoms are characterized and diagnosed. While some of these areas of investigation are not completely new and have been examined before, the possibility of multiple causes and interactions between these causes has not been examined as closely as it is being examined in current ADHD research.

Questions for Further Discussion

1. How might a psychology professional help parents or teachers understand the neuroimaging techniques and brain areas associated with ADHD?
2. If a college student has ADHD, what aspects of their school or personal lives might be impacted by problems with vigilance or cognitive control?
3. What kinds of problems may arise in individuals taking ADHD medications when they do not have the actual symptoms of the disorder?

Chapter Summary

Neurons and Nerves: Building the Network

2.1 Identify the parts of a neuron and the function of each.

- The nervous system is a complex network of cells that carries information to and from all parts of the body.
- The brain is made up of two types of cells, neurons and glial cells.
- Neurons have four primary components: dendrites that receive input, a soma or cell body, axons that carry the neural message to other cells, and axon terminals that are the site of neurotransmitter release.
- Glial cells separate, support, and insulate the axons of some neurons; they influence thinking, memory, and other forms of cognition.
- Myelin insulates and protects the axons of some neurons. Some axons bundle together in “cables” called nerves. Myelin also speeds up the neural message.
- A neuron contains charged particles called ions. When at rest, the neuron is negatively charged on the inside and positively charged on the outside. When stimulated, this reverses the

charge by allowing positive sodium ions to enter the cell. This is the action potential.

- Neurons fire in an all-or-nothing manner. It is the speed and number of neurons firing that tell researchers the strength of the stimulus.

2.2 Explain the action potential.

- Synaptic vesicles in the end of the axon terminal release neurotransmitter chemicals into the synapse, or gap, between one cell and the next. The neurotransmitter molecules fit into receptor sites on the next cell, stimulating or inhibiting that cell’s firing. Neurotransmitters may be either excitatory or inhibitory.

2.3 Describe how neurons use neurotransmitters to communicate with each other and with the body.

- The first known neurotransmitter was acetylcholine (ACh). It stimulates muscles, helps in memory formation, and plays a role in arousal and attention.
- GABA is the major inhibitory neurotransmitter; high amounts of GABA are released when drinking alcohol.
- Serotonin (5-HT) is associated with sleep, mood, and appetite.